# Partnerships for Scaling Climate-Smart Agriculture (P4S) Phase II

# 2019 annual report

*Jules Bayala, Adéyèmi Chabi, Catherine Dembele*

JANUARY 30, 2020

**ICRAF-WCA Sahel**
BP E5118, Bamako, Mali, Telephone: +223 20 70 92 20|

## 1. Basic Project Information

| | |
|---|---|
| Project Title | **Partnerships for Scaling Climate-Smart Agriculture (P4S) Phase II** |
| Institution *(Partner's Name and full address)* | World Agroforestry Centre, West and Central Africa Regional Office (ICRAF-WCA), Sahel Node \| BP E5118, Bamako, Mali, Telephone: +223 20 70 92 20 |
| Name of Partner's Project Investigator *(project coordinator)* | Dr. Bayala Jules |
| Duration *(Start-End ; mention any extension if applicable)* | January - December 2019 |
| *Budget (currency as indicated in the sub-agreement)* | 225,000 USD |
| CCAFS sub-agreement no. Or Addendum number | Addendum 5 |
| CCAFS Theme and Objective | **FP2:** Climate Smart Technologies and Practices<br>**Objective:** P4S' objective is to provide CSA evidence and tools to key partners at the right time and format to create a sea change in implementation of CSA. |
| Geographic cover *(sites, countries)* | Burkina Faso, Ghana and Senegal |
| Partners *(list partners, names of collaborators and full address)* | Dr Bationo Babou André, INERA, Burkina Faso<br>Dr Buah Saaka, SARI, Ghana<br>Dr Sanogo Diaminatou, ISRA, Senegal<br>Dr Somda Jacques, IUCN, Burkina Faso |
| Report prepared by *(person who prepared the report)* | Dr Jules Bayala, Dr Adéyèmi Chabi, Dr Catherine Dembele |
| Report endorsed by *(head of department or Director General who endorsed the report)* and date | Dr Rosenstock Todd<br>ICRAF Focal person for CCAFS |
| Submission date and Stamp | 30 January 2020 |

## 2. The Research Problem

*The basic rationale for the project and the research problem or problems that were addressed should be stated and why the research is being conducted*

African societies face growing global risks associated with rapidly changing patterns of human settlements and intense use of ecosystem services. At the same time climate variability and change has emerged as a major threat to agriculture, food security and livelihood of millions of people in many places in Africa (IPCC, 2014). Climate change and variability trends are intensifying stress on the ecosystems both locally (e.g. ecosystem services), regionally (e.g. sustainable development options) and internationally (e.g. carbon sequestration). Several studies indicate that agriculture production is being increasingly and significantly impacted due to increased temperatures, changed rainfall patterns, and more frequent and intense floods and droughts.

In West-Africa region, agro-sylvo-pastoral production systems are mostly climate-dependent, and climate-related risks can cause severe losses of crop, forest and livestock production, the main livelihood activities of more than 80% of the population. In light of these constraints, more sustainable production systems, ensuring provision of the needs of current generation without jeopardizing those of future generations, are called for.

In response, a more holistic approach, known as Climate-Smart Agriculture (CSA), is being developed, aiming at (i) sustainably improving productivity and income, (ii) adapting and building resilience to climate change and (iii) reducing and/or removing greenhouse gases emissions, where possible (FAO, 2013). There are many options to reduce the negative impacts of climate change on agricultural systems, make them resilient to climate change, and reduce emissions. Thus, to help West African farmers develop resilience to climate change, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) seeks to develop up-scalable options of CSA through improved understanding of mitigation and adaptation opportunities in agriculture among smallholders in West Africa. In 2015, CCAFS and ICRAF signed a partnership agreement to implement the project ***"Building resilient agro-sylvo-pastoral systems in West Africa through participatory action research (BRAS-PAR).*** A sister project entitled "**Partnerships for Scaling Climate-Smart Agriculture (P4S) Phase I**" was conducted in East Africa at the same period going from 2015 to 2018. Merging the actions of BRAS-PAR and P4S I to become P4S II was done in 2018 with the intention to use tools and evidence/lessons learned from the Climate-Smart Villages and other development activities, with existing and new partners through direct scientific support to decision makers (e.g., governments, civil society, and researchers) and capacity building to help bring CSA to scale. This project led by the World Agroforestry (ICRAF) and jointly implemented with the national research institutes in Burkina-Faso, Ghana and Senegal, and the International Union for Conservation of Nature (IUCN) aims to provide CSA evidence and tools to key partners at the right time and format to create a sea change in implementation of CSA.

This report covers the activities that were implemented from January to December 2019 in close collaboration with INERA (Burkina-Faso), CSIR-SARI (Ghana), ISRA (Senegal) and UICN (Burkina-Faso). In this report, we consider a technology or practice as climate-smart if it can help to achieve at least one pillar of CSA (either increases productivity or increases resilience or reduces GHG emission) through the implemented actions. The reported achievements cover the key activity areas of P4S II which are :

- Supporting CSA investment and programming;
- De-risking agriculture;
- Digital delivery and monitoring;
- Community based scaling of CSA.

For historical reasons, the bulk of the achievements are under the fourth area on CSA deployment for the local communities.

## 3. Methodology

*Describe the research methods and analytical techniques used and any problems that arose. Research instruments such as questionnaires, interview guides, and any other documentation judged useful to understanding the project should also be attached. Indicate and explain any changes in orientation that may have occurred since the project was designed. Indicate any particular learning about merits of different methods for addressing the project's research problem and generating desired outputs and outcomes.*

The project operates in selected benchmark sites in Burkina Faso, Ghana, and Senegal (see Bayala et al., 2016 and Förch et al. 2013 for detailed characteristics of the sites).
The implementation of P4S is based on participatory research approach. Scaling up of CSA options in Burkina Faso has been based on participatory analysis of the situation of vulnerability and adaptation capacity to the impact of climate change in the community in a new site of Tialgo (Tenado department) in the centre-west region of the country. The identified communities were subsequently involved in the diagnosis of problems /constraints, and identification of potential solutions. This participatory exercise will culminate with the development of partnership and implementation of field tests and lessons learning in this new site of Tialgo. This temporary relocation of the activities is due to the security issues the country is experiencing currently.
On-farm participatory testing has continued in Ghana and Senegal with a re-orientation of the activities based the goal and new directions of P4S.
To strengthen existing social learning practices in order to facilitate the scaling of the climate smart agriculture in Ghana and Burkina Faso, a study has been conducted by IUCN and the national teams of these two countries combining group discussion at the communities level (women and men) and individual interviews of key informants (farmers, agric. extension officers, NGOs, CSR/SARI, INERA, etc.). Thus, the focus group discussions were conducted in CCAFS intervention communities in Ghana (Doggoh and Bompari) and Burkina Faso (Tibtenga and Ramdolla). The focus group discussions were conducted using the following checklist (Somda et al. 2020 at https://ccafs.cgiar.org/research-highlight/scaling-climate-smart-agriculture-linking-participatory-action-research-social#.XimlLRe2zyx):

*Part 1: identification of the different local methods for social learning*

- ✓ Obtain a list of the different local methods (formal or informal) that are currently or have been used by community members to learn from each other in various areas of their life;
- ✓ Identify strategies used in each method to promote learning;
- ✓ Assess the effectiveness of each method for promoting learning within the community;
- ✓ Assess the beneficiaries of each method between the farmers with direct access to technology and inputs (as educators) and those without direct access (learners);
- ✓ Assess the role of external events in the existing methods

*Part 2: Identification of the Institutions and socio-cultural events in social learning*

- ✓ Obtain a list of institutions and socio-cultural events that contribute to learning, adoption and diffusion of agricultural technologies;
- ✓ Obtain a brief description of each institution and sociocultural event;
- ✓ Assess the important of each institution and sociocultural events in contributing to learning, adoption and diffusion of agricultural technologies;
- ✓ Identify the major players of each institutions and socio-cultural events and their contribution to learning and describe their roles and contributions.

In addition to the focus group discussion, individual interviews were conducted to triangulate the view of the smallholder farmer and extension officers from governmental and nongovernmental organizations.
In Ghana, review and planning meetings were held in two CSVs in June 2019 followed by community participatory technology development (PTD) workshops to identify, prioritize and validate CSA innovations or technologies for scaling.
In the perspective to identify the social learning group and to strengthen their adaptive capacity on CSA a training was organized involving 33 farmers and 12 villages around the CSV of Daga-Birame in Senegal. Value chains approach was mainstreamed in the existing platform including a social learning group for scaling up developed CSA in the CSV of Daga Birame. Cost-benefit analysis was conducted for tested technologies to produce evidence of what works and what doesn't.
In the countries, establishing partnership has been key to strengthen CSA deployment and mainstream it in on-going projects/programs. To do so, capacity development was conducted through a range of actions: field visits, formal trainings demonstration, etc.

4. **Project Activities** ***(in bullet points and rationale included). Describe the activities supported under the project.***

**In Burkina Faso:**
**INERA - Burkina-Faso**

- The participation of the team to the International Symposium on Science and Technology; (SIST 2019) from 10 to 14 Posters 2019 through the presentation of two posters;
- Participation to the UICN field work on social learning in Yatenga;
- Baseline study in Tenado commune for upscaling CSA technologies;
- Capacity building activities;
- Publications.

**UICN - Burkina-Faso**

- Document evidence on what works where from the CSV and a journal article on the behavioral changes and social learning from the CSV is ongoing;
- Identify social learning groups and capacitate them on the CSA technology packages. We identify CSA gaps of social learning group and elaborate capacity development plans for the social learning groups. The data collection completed for Ghana and Burkina Faso.
- Communication, publication and reporting.

**SARI - Ghana**
Activities carried out at the CSVs in 2019 included the following:

- Community entry and farmer selection;
- Establishment of on-farm trials;
- Evaluation on the use of climate information on agriculture in Climate-smart villages;
- Conducting social learning work to scaling out climate smart agricultural practices at community level in Ghana and Burkina Faso;
- Village Midline Study: Site Analysis Report for Doggoh, Lawra- Jirapa, Ghana (GH-0108);
- Capacity building;

- Field visits;
- Meetings attended in 2019.

**ISRA - Senegal**

Activity P34A174: Influence policy (local and agro-sylvo-pastoral)

- Establishment evidence of what is working in the CSV,
- Identification of the learning social group and strengthening their capacity on CSA technologies;
- Capacitating farmers to access the inputs needed to implement the CSA practices/technologies,

Activity P34A195: Develop smart value chains to attract private sector

- Capacitating stakeholders for the implementation of risks management activities.

Activity P34A195: Scaling up packages of CSA technologies (RNA + GIFS + SIC)

- Exchange visits;
- Test and validate CSV for the new sites;
- Mapping the dissemination of adopted CSA options (evidence establishment);
- Strengthening the partnership (existing and new partners);
- Identifying and establishing dialog groups on agro-sylvo-pastoral policy;
- Identifying champions and strengthening them to advocate for policy change,
- Promoting fruits forests.

## 5. Project Outputs (max 3 pages)

*This section should include a list and short description of the main outputs that resulted from the project. Draft papers for publication or any relevant documents produced shall be attached to the report.*

### 5.1. Supporting CSA investment and programming

This is the area where the West African team lacks expertise and needs support.

### 5.2. De-risking agriculture

In developing Community based scaling of CSA, climate information through PICSA training has always been the entry point. Climate information has there been disseminated through formal training of PICSA (how to understand and use climate information), local FM radio and mobile phone. Mobile phones and rural radio have been successfully used to convey weather information to a large audience. Nevertheless, personal interactions are probably most effective for communicating complex climate messages. In worth mentioning that the mobile phone experience took place only in Ghana with Eso company.

Climate information reduces uncertainty and can help farmers make better use of new seeds and technologies. We provided strategic guidance to farmers before (where feasible based on seasonal forecasts) and during the planting season on the most suitable CSA practices, technologies, services, processes, and institutional options considering market and resource availability such as capital, labour, and markets. Over the years, tactical guidance was provided to farmers on using real-time weather forecasts and value-added information and communication technology (ICT)-based agro-advisories; on accessing good quality inputs and

technologies for improving water/ nutrient/energy use efficiencies, and on risk transfer through insurance mechanisms in case of crop and livestock losses

For instance, in Ghana, mobile phone was the main channel of receiving climate information as more than 90% of the households owned mobile phone and its use has increased the income of the households in the range of 41-55%.

In addition, farmers capacitated for warrantage and storage of products as a way to reduce risks in Senegal. In this country, funds were established to support gardening and fruit tree planting within the compounds for the women.

### 5.3. Digital delivery and monitoring

The regional coordination has taken steps to contact VIAMO focal persons in Mali, Burkina Faso, Niger and Ghana to exchange about ways to collaborate for mobile-based dissemination of technical information on climate, CSA, market information in one hand, and in another hand mobile-based monitoring. In addition to these discussions another category of partner has been approached for micro-credit to elaborate a bundle of services (including inputs or finance services) for the farmers. The mobile-based services delivery will include market information, climate information, technical CSA information and input/credit information. Among the three countries, the discussions are more advanced in Burkina Faso where ICRAF, INERA, VIAMO and the national meteorological service through its project "Strengthening national capacities for EWS Service Delivery in Burkina Faso" are working to develop a system that will start in the new site of Tenado which has been selected this year.

### 5.4. Community based scaling of CSA

The bulk of West African team of P4S is under this domain and that is simply due to the fact BRAS-PAR had its focus on this. We will expand the other three domains throughout the years.

***INERA-Burkina Faso***

- Poster 1 : Climate Smart Village (CSV) in Burkina Faso - An upscaling approach of CSA (see the poster attachment in annex 1);
- Poster 2: Behavior change to adapt to climate change - Farmers of Burkina-Faso show the way forward (See the poster in annex 1);
- Preliminary new CSV selection (Tialgo) for upscaling CSA technologies starting with baseline study in Tenado commune. This responds to both the need to expand the work beyond CCAFS benchmark site but also take into consideration the security issues preventing scientists to venture in Tibtenga area. The relocation is also an opportunity of partnership with the national meteorological service of Burkina Faso through its project "Strengthening national capacities for EWS Service Delivery in Burkina Faso";
- Well advanced discussions for a bundle advisory services delivery system to be tested in the new selected site of Tenado which will include climate, CSA, market, credit services with ICRAF, INERA, VIAMO, National meteorological service and credit cooperative.
- Seminar at INERA regional research station of Saria on the concept of CSV.

***UICN-Burkina-Faso***

The main outputs of this activity include:

- One poster produced on the evidence of behavioral changes displayed at the "International Symposium on Science and technology" held in Ouagadougou, from 14 to 18 October 2019;
- Data generated on "social learning methods, enabling institutions, and sociocultural events in Burkina Faso and Ghana". Audio and written records exist on farmers and

extension services perspectives on social learning methods, enabling institutions and sociocultural events, pertaining to the development of social learning plans;

- Communities in Burkina Faso and Ghana use two major social leaning methods: Trust-based conversation and collaborative learning methods. They apply these methods following the observation made and information received by community members during trainings, demonstration plots and extension-users farms;
- In Ghana, the government annually organizes farmer's days at district level to allow farmers showing case of successful farming practices and technologies. This event serves as entry point for social learning. In addition to these farmer's days, the communities' members in Ghana use informal institutions and socio-cultural events as social learning frameworks. Among these informal institutions and social events, the most important are the Village Savings and Loans Associations (VSLA), the farming teamwork, the pito bars and inter-households teamwork;
- In Burkina Faso, no formal institutions promote social learning. Farmers rather rely on informal institutions and socio-cultural events such as farming teamwork and inter-households teamwork to establish the social learning;
- Two draft of scientific articles being written with following provisional titles : (1) Does smallholder farmers' perception meet the expert-defined characteristics of climate-smart technologies? And (2) Making social learning work to scaling out climate smart agricultural practices at community level in Ghana and Burkina Faso;
- A blog was produced (Somda et al. 2020 at https://ccafs.cgiar.org/research-highlight/scaling-climate-smart-agriculture-linking-participatory-action-research-social#.XimlLRe2zyx).

***SARI- Ghana***

- The results over the years showed that the top ten CSA technologies/practices preferred by farmers in the CSVs sites were: improved crop varieties, drought-tolerant, early maturing crop varieties, integrated use of organic and inorganic fertilizers, off-season crop market-gardening, tie ridges, earth bunds and use of climate information services;
- Results in the CSV sites showed that improved varieties of drought tolerant maize led to an average 35% yield increase compared with traditional varieties;
- Economic indicators used for project acceptability criteria indicate that drought tolerant/short cycle variety is the best technology. Based on this, there is the need to strengthen support schemes such as the Government of Ghana flagship project dubbed *Planting for Food and Jobs* that would make it easy for farmers to have access to seeds of drought tolerant crop varieties, early maturing crop varieties and fertilizers in order to increase productivity;
- Tie ridges technology, which helps improve water and nutrient use efficiency, has increased crop yield by 23-32% and net income by 22–32% compared to farmer usual practice of planting on the flat with fertilizer;
- Maize-cowpea rotation, no-tillage with fertilizer, combined tie ridges and fertilizer are potential sustainable intensification options that can improve farm incomes;
- The portfolio of CSA practices and technologies demonstrated multiplier effects on crop yields, nutrient use efficiency, and emissions reduction;
- The portfolio of improved crop varieties, zero tillage, crop rotation and integrated nutrient management has been further evaluated by farmers in their own fields;
- More than 550 farmers of which 37% were women were reached through promotion and awareness creation activities in the region in 2019;

- Through training on good agronomic practices for crop production, the capacity of about 450 farmers to grow the various crops has been enhanced;
- In Upper West region, extra-early and early maturing yellow maize are preferred especially by women for their earliness and yellow endosperm;
- Farmers supported to access the inputs needed to implement the CSA technology package. This involved linking farmers at the CSVs to the Government of Ghana flagship project of *Planting for Food and Jobs* so as to increase farmers' access to subsidized inputs (seed and fertilizers) in other to increase maize and soybean production in the region.
- Biofortified crops introduced. This included high iron millet (ICTP 8203-Fe-2) provatamin A maize (Ahodzin) and orange flesh sweetpotato.
- Recommendations particularly on good agricultural practices (GAP) were made for improvement;
- Partnership established with CARE International, GIZ/MOAP, and Africa Rising.

***ISRA-Senegal***

- Social learning groups identified, and their adaptive capacity strengthened on the packages of CSA technologies;
- The cost-benefit analysis of various developed CSA technologies in the CSV of Daga Birame by ISRA shows that protecting natural regeneration, Farmer Managed Natural Regeneration and domestication are financial and economical viable;
- Farmers capacitated to have access to inputs (seeds and fertilizers) needed to implement some of the CSA techniques with private actors;
- Capacity strengthened through filed visits, training on the use of climate information, grafting;
- Enriching planting comparisons of *Adansonia digitata, Faidherbia albida, Cordyla pinnata* and *Ziziphus mauritiana* realized in the communes of Nidognick and Meouane;
- Fruit tree planting (*Adansonia digitata, Tamarindus indica* and *Ziziphus mauritiana*) and natural vegetation conservation monitored;
- New sites of CSA established at Meouane and Potou and inventory of potential CSA technologies and practices conducted in both sites;
- Partnerships developed to scale up CSA principles with P2RS (a project of CILSS), ENDA Pronat, ENDA Energie, IED;
- Various field visits of partner institutions like FAO on 22 November 2019, AMMA-2050 project on 13 June 2019 and ENDA Pronat with farmers from Fatick and Tambacounda regions.

***Some documents produced by the national teams***

Participation of the team of Burkina Fasso to International Symposium International Science and Technology (SIST) with two posters (documents 1&2 below).

- Barry S, Bationo BA, Sanou J, Somda J, Ouedraogo M, Bayala J, Zougmore R, Dembele C, Dayamba, SD (2019) : Le modèle de Village Climato-intelligent au Burkina Faso ou Climate Smart Village (CSV) : Une approche de mise à l'échelle de l'Agriculture Intelligente face au Climat (AIC)., Symposium International sur la Science et la Technologie, 14 au 18 Octobre 2019, Ouagadougou, Burkina Faso.
- Somda J, Barry S, Bationo B A, Sanou J, Bayala J, Ouedraogo M, Dembele C, Zougmore R (2019) : Les changements de comportement pour s'adapter au changement climatique: Au Burkina Faso, des producteurs montrent la voie à suivre, Symposium

International sur la Science et la Technologie, 14 au 18 Octobre 2019, Ouagadougou, Burkina Faso.
- Sanogo, Diaminatou, Sall, Moussa, Ba, Halimatou Sadyane, Camara, Baba Ansoumana, Diatta, Pierre Maurice. 2019. Les utilisateurs des terres de Kaffrine gagnent à investir dans des pratiques de gestion plus durables. Exemple du village climato-intelligent de Daga Birame et sa plateforme d'innovation. Un rapport de l´initiative ELD dans le cadre du projet « Inverser la dégradation des terres en Afrique par l'adoption à grande échelle de l'agroforesterie ». Disponible sur www.eld-initiative.org
- Sanogo D, Dembele KY, Camara BA, Badji M, Diop M. 2019. Domestication de *Tamarindus indica* (Fabaceae) : évaluation de la croissance et la production fruitière de quatre accessions au Sénégal. Communication orale. Colloque international sur les arbres fruitiers sauvages de l'Afrique de l'Ouest. 28 Novembre au 01 Décembre 2019. Université Assane Seck de Ziguinchor. Communication orale.
- Somda J, Ouedraogo R, Buah S,Barry S,Bationo BA,Bayala J, Zougmoré R : Scaling climate-smart agriculture: Linking participatory action research to social learning Jan 23, 2020, https://ccafs.cgiar.org/research-highlight/scaling-climate-smart-agriculture-linking-participatory-action-research-social#.Xir1DCOH4l0

**6. Gender** *(is gender consider in the project? Please elaborate on how gender is integrated in the project)* (300 words)

The simplistic male-female disaggregation of data has been made for any activity conducted. Beyond, other social groups and social differentiation were considered whenever relevant in replacement or in addition to the male-female divide. For instance, in the social learning, the overall agreement among partners with regards to focus group discussion was gender oriented. This allows capturing gender-differentiated social learning methods, institutions and sociocultural events. Activities for which women have been targeted include fruit tree planting, gardening, tree products processing and tree vegetative propagation (grafting) in Senegal.

The focus group discussion for the social learning conducted by IUCN was gender-oriented to allow capturing gender-differentiated social learning methods, institutions and sociocultural events.

In Ghana, the gender desk officer from Women in Agriculture Development (WIAD) of Department of Agriculture (DOA) dedicated to empowering women, trained a core group of elected women who then took the message to more than 1200 additional women across the region. Crucially, many of the women trainers adapted the messages to be more appropriate to their local culture, turning them into songs because that is how women convey, share and remember important information. Through CCAFS community education the spirit of unity among women has been strengthened. They now freely support one another with communal labor. The women are now more confidence in the informal financial institutions such as Village Loans and Savings Association (VLSA) and Susu groups. Also, mobile money transaction by MTN and other networks are highly patronized as they are considered as reliable and fast in transaction of business. Additional gender sensitive activities carried out at the CSVs included the following: training on postharvest handling and value addition, training on income generation as dry season supplementary activities and training of farmers on Nutrition and health information.

**7. Project Outcomes (if any)** (300 words)

Across the three countries, there is change in behavior of the farmers who are using climate forecasts and climate information in the selecting varieties and cropping operations. They plan their activities based on clear resources assessment and allocation.
In Senegal, several communities of the commune have formerly requested that CSA activities be extended to their villages and one example is Kethiewane which sollicted the extension protected area of natural vegetation activity, Keur Sawely wants the Farmers' Managed Natural Regeneration practice, Keur Baka requested fruit trees as well as gardening. A number of projects have also expressed their will to collaborate including USAID/CINSERE, P2RS in the frame of PROVAL 2 and SOS Sahel.

In Ghana, farmers' Platform has been adopted and institutionalized as a permanent feature of the Kobine (Konbina festival which is the annual farming festival) celebrations in Lawra district and the National farmers' Day in December of each year. Some evidence from the CSVs has also been used to mainstream CSA into major agricultural development programs (e.g., Planting for Food and Jobs, GIZ-Market Oriented Agriculture Project (GIZ/MOAP)-Training and extension in Conservation Agriculture practices). We also succeeded in securing USD12,000 from the IITA/Africa RISING Project to extend CSA into other communities in northern Ghana.

## 8. Overall Risk and Recommendations (300 words)

The major risk for most of the activities is the availability of funds and its disbursement process, which make it difficult to properly implement the annual workplan. It is recommended that contract and sufficient funds be made available to avoid rushing against time. In addition, the amount of funds constitutes a limitation for the implementation of activities at a large scale and this compromise the upscaling process of CSA technologies. A solution from the national team's side should be a strong engagement in funds raising taping into the nationally available and eligible funds. Some attempts were made but remain very limited.

## 9. Policy Implications and Future Directions (300 words)

*This section should summarize the implications of the study findings for actions and policies at local, national, regional and/or international levels. The section should also summarize plans/recommendations for future directions (research, capacity building, and/or policy applications) that would build upon the study's accomplishments.*

The preliminary analysis of the focus group discussion showed potentials to mainstream endogenous learning methods, institutions and sociocultural events into the ongoing efforts to scale out climate smart agriculture practices and technologies. This can be done through the development and experimentation of the social learning within the CCAFS intervention communities.
In term of methods, both men and women in all communities used conversation and collaboration as a social learning methods. Thus, learning within the communities does not end with the formal training organized in the trainer-trainee framework. In other words, learning takes place through participation in multiple social practices, including mainly peer-to-peer conversation and collaboration within communities. This opens space for agricultural research and extension services to support such informal conversation activities toward the organization of formal conservation activities between the communities' members. The content of such formal conversation will be designed in a way that participating farmers periodically sit with their fellows and discuss the implementation process of climate smart agricultural practices and technologies.
In term of institutions and/or socio-cultural events, communities do not have similar institutions and/or social events. In Ghana communities, farmers' day, farming festivals and village savings and loans associations, farming teamwork, inter-household teamwork and pito bars are

institutions and socio-cultural settings used as social learning frameworks by both men and women. In Burkina Faso, men and women used the farming teamwork and inter-household teamwork as social learning frameworks.

For the Way forward:

- We intend to continue to focus on using evidence/lessons learned from the CSVs and other development activities, with existing and new partners through direct scientific support to decision makers (e.g., governments, civil society, and researchers) and capacity building to help bring CSA to scale;
- Identify validated innovations/technologies for scaling and where possible start the scaling up activities;
- Establish contact with potential development scaling partners and share results and requirements of the innovations/technologies;
- Package information of validated innovations/technologies as evidence briefs/ fact sheets;
- The scientific activities will be combined with dedicated communications activities such as photo essays, tweets, blog posts, etc. from field staff and partners to raise the visibility of the project and help show case the successes of this project in supporting these countries and position of ICRAF, CIAT, and CCAFS as the go to research organization for the science of scaling up CSA;
- Provide training for experts, development agents and farmers on the innovations/technologies;
- Explore ways to raise funds to help reach our targets;
- Try as much as possible to influence plans and programs of development/finance institutions so that they take into account what we have to offer. Then document such efforts as our contribution.;
- Conduct assessment of capacity building needs of stakeholders (including ourselves) in our work areas/sites;
- Conduct food demonstration on the various local dishes incorporating soya bean;
- Training women on income generating activities and on informal financial business;
- Train households on improved mud stoves construction.

## 10. References

*List of relevant bibliography/literature cited within the report.*

Bayala J, Zougmoré R, Ky-Dembele C, Bationo BA, Buah S, Sanogo D, Somda J, Tougiani A, Traoré K, Kalinganire A. 2016. Towards developing scalable climate-smart village models: approach and lessons learnt from pilot research in West Africa. ICRAF Occasional Paper No. 25. Nairobi: World Agroforestry Centre.

Diduck AP. 2010. The learning dimension of adaptive capacity: untangling the multi-level connections. In Armitage D, Plummer R (Eds.), Adaptive Capacity: Building Environmental Governance in an Age of Uncertainty (pp. 199-221). Heidelberg, Germany: Springer.

ELD Initiative (2019). ELD Campus. Module: Land degradation versus sustainable land management. ELD, Bonn, Germany.

Food and Agriculture Organization (FAO) 2013. Climate smart agriculture. Sourcebook. FAO, Rome, Italy.

Förch W., Sijmons K., Mutie I., Kiplimo J., Cramer L., Kristjanson P., Thornton P., Radeny M., Moussa A., Bhatta G. 2013. Core Sites in the CCAFS Regions: East Africa, West Africa and South Asia, Version

Intergovernmental Panel on Climate Change (IPCC). 2014. *Climate change 2014: synthesis report.* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R. K. Pachauri and L. A. Meyer, editors]. IPCC, Geneva, Switzerland.

Leys AJ, Vanclay JK. 2011. Social learning: A knowledge and capacity building approach for adaptive co-management of contested landscapes. Land Use Policy 28(3): 574-584.

Somda J, Ouedraogo R, Buah S, Barry S, Bationo BA, Bayala J, Zougmoré R. 2020. Scaling climate-smart agriculture: Linking participatory action research to social learning. Blog. https://ccafs.cgiar.org/research-highlight/scaling-climate-smart-agriculture-linking-participatory-action-research-social#.XimlLRe2zyx.

Vågen Tor G, Winowiecki L, Walsh MG, Desta LT, Tondoh JE. 2010. Land Degradation Surveillance Framework (LSDF): field guide. International Center for Tropical Agriculture, World Agroforestry Centre, and the Earth Institute at Columbia University.

Woodhill, J. 2010. Sustainability, social learning and democratic imperative: lessons from the Australian landscape movement. In: C. Blackmore, Ed. Social learning systems and communities of practice. Part II, 57-72. London: Springer.

ELD Initiative (2019). ELD Campus. Module: Land degradation versus sustainable land management.

**Annex 1**: Posters produced by the team of Burkina-Faso

# Le modèle de Village Climato-intelligent au Burkina Faso ou Climate Smart Village (CSV) : Une approche de mise à l'échelle de l'Agriculture Intelligente face au Climat (AIC)

BARRY Silamana[1], BATIONO Babou André[1], SANOU Josias[1], SOMDA Jacques[2], OUEDRAOGO Mathieu[3], BAYALA Jules[4], ZOUGMORE Robert[3], DEMBELE Catherine[4], DAYAMBA, S. Djibril[4] [1]: INERA-Burkina Faso; [2]: UICN Burkina Faso , [3]: ICRISAT/CCAFS, [4]: ICRAF

**Introduction** : Le changement climatique (CC) est une réalité qui menace la sécurité alimentaires des populations surtout dans les pays sahéliens comme le Burkina Faso. Le Programme de Recherche sur le Changement Climatique, l'Agriculture et la Sécurité Alimentaire (CCAFS) travaille avec l'Institut de l'Environnement et de Recherches Agricoles (INERA) et d'autres partenaires pour atténuer les effets de ce CC à travers le concept de Village Climato-Intelligent (CSV). L'approche CSV se veut anticipative et holistique sur la vision de l'agriculture et des agroécosystèmes souhaités par les producteurs pour faire face aux perturbations climatiques extrêmes et récurrentes. Cette approche a pour objectifs i) d'augmenter durablement la productivité agricole, les revenus, la sécurité alimentaire et le développement ; ii) d'adapter et renforcer la résilience au CC à toutes les échelles et iii) de réduire les émissions de gaz à effets de serre du secteur agricole.

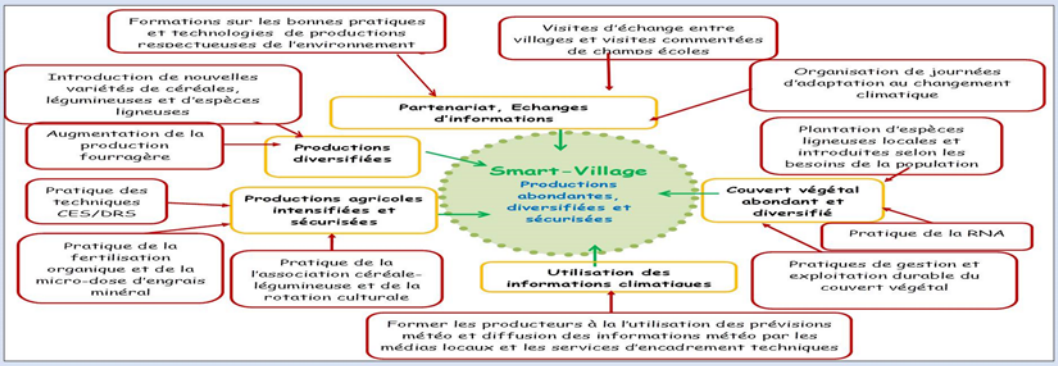
**Méthodologie** : Elle consiste en une combinaison méthodes de groupes et individuelles pour une démarche de co-apprentissage dans le village de Tibtenga situé dans la province du Yatenga. Le choix a été guidé par le nombre limité d'interventions des partenaires au développement dans ce village. Sa pluviométrie moyenne annuelle varie entre 400 et 700 mm. L'érosion des sols est très répandue. Les éléments de l'approche sont:

1 : un diagnostic participatif de la situation de référence avec un focus groups par une équipe pluridisciplinaire pour identifier : les moyens de subsistance actuels des différentes catégories sociales (femmes et hommes), le futur du secteur agricole souhaité pour mieux s'adapter aux effets du changement et de la variabilité climatiques, élaboration participative du modèle CSV souhaité et construction stratégique d'un partenariat pour mettre en œuvre ce modèle CSV souhaité,

2 : Des champs écoles ont ensuite été des cadres de visites et d'échanges pour la diffusion des bonnes pratiques de producteur à producteur.

3 : Afin de renforcer davantage les capacités, des voyages d'étude ont été organisés au profit des producteurs et des agents des services de vulgarisation agricoles sur des thématiques portant sur la conservation des eaux et sols et la récupération des terres dégradées par l'agroforesterie.

4 : L'utilisation l'information climatique (prévisions météorologiques) pour le choix des pratiques agricoles par les agriculteurs dans les villages CSV et pour planifier leurs activités agricoles.




## Résultats

Aménagement de 80 hectares de cordons pierreux/an, introduction de demi-lune et RNA

Photo 1 : Cordons pierreux

Photo 2 : Demi-lunes

Photo 3 : Régénération Naturelle Assistée

L'adoption de plusieurs variétés améliorées de céréales, légumineuses et ligneuses

Photo 4 : Patate douce bio-fortifiée

Photo 5 : Semis en ligne du sésame

Photo 6 : Mil bio-fortifié

- Introduction de deux variétés améliorées de niébé et d'une variété améliorée de sésame (SR42),
- Introduction du semis en ligne du sésame conduisant a un accroissement des rendements de 225%,
- Création de 4 pépinières villageoises,
- Plantation de 200 000 plants d'une vingtaine d'espèces ligneuses
- Réalisation de 2 hectares de Zaï mécanisé,
- Réalisation 50 hectares de Zaï amélioré ( en quinconce),
- Réalisation 5 hectares de diguette en terre,
- Introduction de 10 biodigesteurs,
- Renforcement de l'accès au matériel agricole (charrettes et brouettes distribués à plus de 200 producteurs),
- Plus de 600 producteurs ont participé à des voyages d'étude inter paysans,
- Plus de 600 producteurs ont vu leurs capacités renforcés dans la compréhension et l'utilisation des prévisions climatiques,
- Les résultats d'enquêtes ont montré que 90% des ménages enquêtés utilisent l'information climatique (IC) reçue pour planifier leurs activités agricoles,
- L'IC s'est avéré rentable (Un franc investi dans l'IC rapporte 6 francs),
- Augmentation des rendements de niébé (847 kg/ha pour les producteurs utilisant l'information climatique contre 685 kg/ha)

**Conclusion** : L'approche CSV présente d'énormes possibilités pour l'apprentissage de ce qui marche dans un contexte donné et l'adapter aux autres. L'une des grandes forces de l'approche CSV est son caractère inclusif. Le modèle CSV a produit des impacts physiques et sociaux importants. Les impacts sont entre autres liés à l'organisation sociale dans les villages, au renforcement des capacités techniques, au développement de la collaboration entre les services techniques et au partenariat.

## Références

**Bayala J, Zougmoré R, Ky-Dembele C, Bationo BA, Buah S, Sanogo D, Somda J, Tougiani A, Traoré K, Kalinganire A 2016.** Towards developing scalable climate-smart village models: approach and lessons learnt from pilot research in West Africa. ICRAF Occasional Paper No. 25. Nairobi: World Agroforestry Centre

**CCAFS 2016.** Climate-Smart Villages. An AR4D approach to scale up climate-smart agriculture. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

**Ouedraogo M, Barry S, Zougmore RB, Partey ST, Some L., Baki G 2018.** Farmers' willingness to pay for climate information services: evidence from cowpea and sesame producers in northern Burkina Faso. Sustainability 10 (3),611.

**Ouédraogo M, Zougmoré R, Barry S, Somé L, Grégoire B. 2015** The value and benefits of using seasonal climate forecasts in agriculture: Evidence from cowpea and sesame sectors in climate-smart villages of Burkina Faso (Info Note, pp. 1– 4). Wageningen, Netherlands: CCAFS.

**SIST2019,** Symposium International sur la Science et la Technologie

**Ouagadougou, du 14 au 18 Octobre 2019**

# LES CHANGEMENTS DE COMPORTEMENT POUR S'ADAPTER AU CHANGEMENT CLIMATIQUE: AU BURKINA FASO, DES PRODUCTEURS MONTRENT LA VOIE À SUIVRE

SOMDA Jacques[1], BARRY Silamana[2], BATIONO Babou André[2], SANOU Josias[2], BAYALA Jules[3], OUEDRAOGO Mathieu[4], DEMBELE Catherine[3], ZOUGMORE Robert[4]
1: UICN Burkina, 2 : INERA Burkina, 3 : ICRAF, 4: CCAFS

**Introduction :**
Le Burkina Faso avec plus de 80% de sa population employée dans la production agropastorale figure parmi les pays les plus vulnérables à la variabilité et au changement climatique. Pour faire face à cette menace, plusieurs technologies climato-sensibles ont été développées par la recherche scientifique et d'importants efforts sont consentis pour leur vulgarisation auprès des agropasteurs. Cependant, leur faible niveau d'adoption a souvent été perçu comme un manque de changements de comportements par les producteurs. Pourtant très peu de recherches scientifiques ont été conduites au Burkina Faso sur ce sujet chez les agropasteurs

Le Programme de recherches sur les Changement Climatique, Agriculture et Sécurité Alimentaire (CCAFS) a doc été initié une recherche dans ce sens. L'objectif général de la recherche de renforcer les capacités des acteurs de la recherche et du développement à soutenir les communautés rurales pour planifier et mettre en œuvre des actions d'adaptation au changement climatique. De façon spécifique, il s'agit d'analyser les domaines de vie des agropasteurs dans lesquelles des changements sont induits par l'application des technologies climato-sensibles.

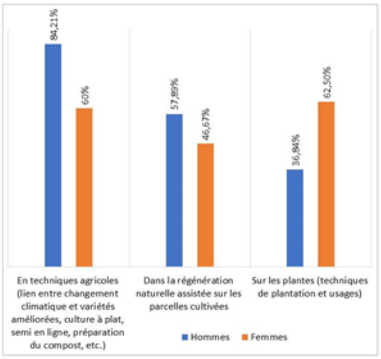
**Méthodologie :**
Cette démarche d'apprentissage participatif, a été conduite entre 2012 et 2014 dans le village de Tibtenga au Burkina Faso. Elle a appliquée la Trousse à Outils de Planification et de Suivi-évaluation des Capacités d'adaptation au Changement Climatique (Somda et al., 2011). Cette trousse comprend des outils qui ont permis :

(i) d'analyser la vulnérabilité des agropasteurs et de leurs ressources d'existence (Somda et al., 2014);
(ii) d'identifier et planifier des actions d'adaptation ainsi que les changements de comportements induits si ces actions ont réussies (Sawadogo et al., 2013), et
(iii) de suivre et évaluer en particulier les domaines dans lesquels les changements de comportement se produisent du fait de la participation des agropasteurs à la mise en œuvre des actions d'adaptation (Somda et al., 2017).

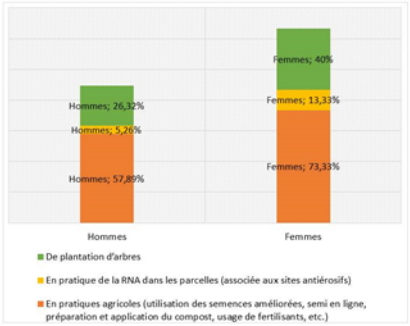
La technique du changement le plus significatif (Davies et Dart, 2005) a été appliquée pour collecter des récits de changements que les agropasteurs considèrent avoir été induit par leur participation aux actions d'adaptation promues par le projet. Les récits collectés ont été vérifiés et une analyse quantitative du contenu a été conduite sur les domaines de changements de comportements mentionnés afin d'évaluer leur importance au sein des communautés à travers l'analyse de fréquence.

**Résultats :**
Les résultats de suivi de 34 producteurs sur la période 2013-2014, ont révélé que les technologies climato-sensibles, planifiées de manière participative et intégrant les changements biophysique et comportementaux, ont induit des changements chez les agropasteurs dans six domaines à savoir, les connaissances, les pratiques, les organisations, le partenariat, l'accès aux ressources et la sécurité alimentaire (voir figures en bas). Ces changements variables en nature et en importance suivant le genre, se mettent en place parfois plus rapidement qu'on ne le pense. Il faut donc pouvoir les identifier et les soutenir en même temps que les changements biophysiques obtenus des technologies climato-sensibles.

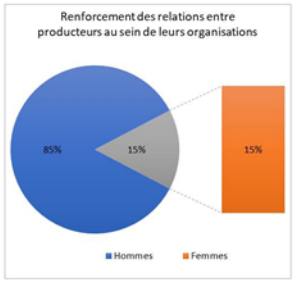
1. Changements dans les connaissances



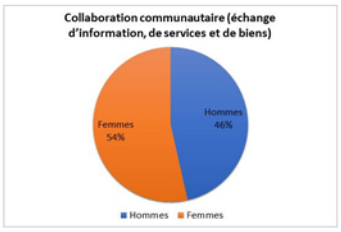

2. Changements dans les pratiques



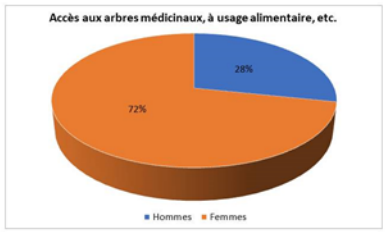

3. Changements organisationnels




4. Changements dans le partenariat




5. Accès aux ressources productives (plants, semences)




6. Changements dans la sécurité alimentaire


**Conclusion :** La planification et le suivi-évaluation participatifs ont permis d'identifier des activités qui ont amélioré la capacité d'adaptation au changement climatique des communautés de 8 villages du Burkina Faso. Ces changements se mettent en place dans divers domaines et ce, de manière plus rapide pour les connaissances. Aussi, pour renforcer la résilience des communautés une attention forte doit être accordée à la progression des partenaires vers la mise en place de changements dans les domaines ici identifiés. D'où la nécessité de soutenir ce type de dispositif qui permet de suivre les effets peu observés (comportements) des interventions d'adaptation pour renseigner sur la pertinence des effets biophysiques recherchés, la valeur ajoutée et la durabilité de celles-ci.

**References :**
1. Davies, R., & Dart, J. 2005. The 'Most Significant Change' (MSC) technique: A guide to its use. http://www.mande.co.uk/docs/MSCGuide.pdf.
2. Sawadogo, I., Somda, J., Zougmore, R., Sanou, J., Nakoulma, G. H., Barry, S. et Sanou, H. O. 2013. Le TOP-SECAC, un outil simple pour analyser la vulnérabilité et faire le suivi-évaluation. Blog ccafs 16 décembre 2013.
3. Somda, J., Faye, A. et N'Djafa, O, H.. 2011. Trousse à outil de planification et suivi-évaluation des capacités d'adaptation au changement climatique. Manuel et Guide d'utilisation. Centre Régional AGRHYMET, Niamey, Niger. 88 pages. https://www.iucn.org/downloads/top_secac_agrhymet_edition_francaise_combine.pdf. .
4. Somda J., Sawadogo I., Savadogo M., R. Zougmoré, B. A. Bationo, Moussa A. S., Nakoulma G., Sanou J., Barry S., Sanou A. O. and Some L., 2014. Analyse participative de la vulnérabilité et planification de l'adaptation au changement climatique dans le Yatenga, Burkina Faso. Programme de recherche du CGIAR sur le Changement Climatique, l'Agriculture et la Sécurité Alimentaire. Disponible en ligne sur www.ccafs.cgiar.org
5. Somda, J., Zougmore, R., Sawadogo, I., Bationo, B.A. Buah, S. and Abasse, T. 2017. Adaptation Processes in Agriculture and Food Security: Insights from Evaluating Behavioral Changes in West Africa, In J.I. Uitto et al. (eds.), Evaluating Climate Change Action for Sustainable Development, DOI 10.1007/978-3-319-43702-6_14.

**Annex 2:** Tables of some key results in Ghana

Table 2.1: Number of farmers who planted the trials at Doggoh and Bompari/Dazuuri in 2019.

| Community | Men | Women | Total |
|---|---|---|---|
| Doggoh | 16 | 12 | 28 |
| Bompari/ Dazuuri | 12 | 5 | 17 |
| Total | 28 | 17 | 45 |

Table 2.2: Summary of experiment, crop variety used and number of farmers who implemented the technologies in the climate smart village (2018).

| No. | Experiment | M | F | Doggoh | M | F | Bompari |
|---|---|---|---|---|---|---|---|
| 1 | Maize cowpea rotation | 6 | 2 | 8 | 1 | 1 | 2 |
| 2 | Tie ridges | 6 | 5 | 11 | 6 | 2 | 8 |
| 4 | Soybean Inoculants | 0 | 2 | 2 | 0 | 1 | 1 |
| | **Sub-total** | **12** | **9** | **21** | **7** | **4** | **11** |
| 1 | Pro vitamin A Maize | 2 | 0 | 2 | 2 | 0 | 2 |
| 2 | Iron rich millet | 2 | 1 | 3 | 1 | 1 | 2 |
| 3 | Orange flesh sweet potato | 0 | 2 | 2 | 2 | 0 | 2 |
| | **Sub-total** | **4** | **3** | **7** | **5** | **1** | **6** |

Table 2.3. Maize-cowpea rotation effects on Grain yield (kg $ha^{-1}$) of maize at Doggoh and Bompari in 2019.

| Treatment | Doggoh | Bompari |
|---|---|---|
| Continuous maize +NPK | 2062b | 1200 |
| Continuous maize + 2t $ha^{-1}$ manure + ½ NPK | 2418a | 1720 |
| Maize after cowpea + ½ NPK | 2649a | 1600 |
| CV% | 13.2 | |

*Means in the same column followed by the same letter are not significant different at 5% probability level*

Table 2.4.Tied ridges, flat planting and fertilizer effects on grain yield ((kg $ha^{-1}$) of maize at Doggoh and Bompari in 2019.

| **Treatment** | **Doggoh** | **Dazuuri** | **Bompari** |
|---|---|---|---|
| Flat planting | 2400b | 1140b | 1390b |
| Tie ridges | 2956a | 1510a | 1830a |
| CV% | 4.3 | 3.6 | 8.7 |

*Means in the same column followed by the same letter are not significant different at 5% probability level*

**Annex 3:** Exchange visits in Senegal. The members of innovative platform of Daga Birame (3 women, 7 men) were trained on potential activities that they can developed in their CSV (fishing, honey production, nursery forestry, gardening, and pitfall) beyond that were previously developed.